Alaska Department of Fish and Game
Division of Wildlife Conservation
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Identifying and Evaluating Techniques for Wildlife Habitat Management in Interior Alaska

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Research Performance Report
1 July 2003–30 June 2004
Federal Aid in Wildlife Restoration
Grant W-33-2
Study 5.0

This is an interim progress report, and information may be refined at a later date.

FEDERAL AID
ANNUAL RESEARCH PERFORMANCE REPORT

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 25526
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PROJECT TITLE: Identifying and evaluating techniques for wildlife habitat management in Interior Alaska

PRINCIPAL INVESTIGATORS: Dale A. Haggstrom and Thomas F. Paragi

COOPERATORS: Gordon Worum, Division of Forestry, Alaska Department of Natural Resources (DNR)

FEDERAL AID GRANT PROGRAM: Wildlife Restoration

GRANT AND SEGMENT NR: W-33-2

PROJECT NR: 5.0

WORK LOCATION: Game Management Units 12, 20A, 20B, and 20D in the Tanana River drainage and 20E in the Fortymile River drainage

STATE: Alaska

PERIOD: 1 July 2003–30 June 2004

I. PROGRESS ON PROJECT OBJECTIVES SINCE PROJECT INCEPTION

OBJECTIVE 1: Gain a working knowledge of sampling designs and statistical estimators potentially suited for evaluation of habitat enhancement techniques being considered for use in the boreal forest of interior Alaska.

We conducted literature reviews on regenerating aspen by prescribed fire and mechanical treatments; sampling stem density in shrub communities; sampling volume and vertical structure of coarse woody debris; monitoring habitat use by furbearers and their prey through track counts in winter; and estimating relative abundance of forest grouse.

We also contacted several biologists in the upper Midwest about their experience with mechanical (non-harvest) treatments in aspen before the pulp market had developed in that region.

OBJECTIVE 2: Determine the relative efficacy and cost of using felling and shearblading (with and without removal of trees) and low-severity prescribed burning to stimulate root sprouting of suckers in mature stands of quaking aspen.

Permanent 1 x 5 m plots were established during autumns 1999 through 2001 at the Nenana Ridge, Two Rivers, and Delta Junction ruffed grouse project areas, and the Heritage Forest Outdoor Education and Recreation Site to monitor aspen suckering response to felling, prescribed burning, and shearblading treatments. Data on stem density and the covariates slope, aspect, density class of debris (felling units only), proportion of adjacent trees killed (burn units only), and herbaceous community composition were collected at the end of the second growing season after disturbance.

A 30-acre experimental treatment area was established at the Nenana Ridge project area to compare aspen suckering response after felling between windrowed and non-windrowed areas. Soil temperature probes were buried in cleared areas and in windrows to test for differences in soil temperature for correlation to aspen sprouting density.

At the Delta Junction ruffed grouse project area, a 10 m x 10 m exclosure 2 m tall was constructed from welded wire livestock fencing to monitor aspen stem density and growth in the absence of browsing by snowshoe hares and moose. Soil temperature probes were also buried in shearbladed areas between and within windrows to test for differences in soil temperature for correlation to aspen sprouting density.

OBJECTIVE 3: Determine the relative efficacy and cost of using postlogging site preparations (e.g., disk trenching, blade scarification and broadcast burning) to improve establishment of willow shrubs and hardwood saplings after timber is harvested from riparian white spruce stands.

A randomized block design is being used in 12 study sites along the Tok River to evaluate the efficacy of postlogging site treatments (disk trenching, blade scarification, and broadcast burning) for regenerating woody browse and cover.

OBJECTIVE 4: Determine the relative efficacy and cost of using postlogging site preparations (e.g., disk trenching, blade scarification, broadcast burning and willow planting) to improve establishment of willow shrubs and hardwood saplings after timber is harvested from upland forest stands.

Permanent 1 x 5 m plots were established in the 1996 postlogging prescribed burn at Standard Creek near Fairbanks to monitor long-term survival of planted feltleaf willow and post-fire density of paper birch and willow.

OBJECTIVE 5: Determine the relative efficacy and cost of using crushing or other appropriate mechanical treatments, or prescribed burning, to rejuvenate willow stands with various species compositions and site characteristics.

Response of willows to mechanical crushing is being monitored in the 1996 project along Goldstream Creek north of Fairbanks to evaluate the efficacy of this technique.

OBJECTIVE 6: Contrast the feasibility and statistical properties of plot and plotless (nearest-neighbor) techniques for estimating stem density of deciduous hardwoods on disturbed sites at the stand scale.

Paragi reviewed the literature on these sampling techniques during winter 1999–2000.

OBJECTIVE 7: Evaluate techniques for estimating vertical and horizontal cover.

Paragi reviewed the literature on these techniques.

OBJECTIVE 8: Develop a true-color or color-infrared aerial photography technique to evaluate the success of landscape-scale prescribed burns in converting spruce-dominated stands to early-succession forbs, shrubs or hardwood saplings.

Planning began in summer 2001 for comparing the resolution and cost efficiency of using color infrared (CIR) photography and high resolution satellite imagery (2.6 m multispectral/0.6 panchromatic Quickbird imagery; DigitalGlobe™, Longmont, Colorado, USA) to classify vegetative cover on prescribed burns. We are working with DOF staff experienced in computer-based GIS to import digitally scanned photos into a GIS, rectify the image with ground control points, and merge imagery with a digital elevation model for enhanced resolution. Field work will be done to ground truth the vegetation polygons and pixel groups in the aerial photos and satellite imagery, respectfully. In addition to comparing the two methods of postfire typing for resolution and cost efficiency, we will compare the postfire imagery with prefire CIR imagery already in the GIS database maintained by DOF to conduct the change detection.

OBJECTIVE 9: Evaluate the feasibility of indices to presence and relative abundance (e.g., drumming by male ruffed grouse, furbearer and prey track intersections along transects in winter, pellet groups for moose) and of estimator techniques (e.g., flushing counts for grouse broods, line transect estimators for snowshoe hares) for animals at the stand and landscape scales.

Moose pellet groups are being sampled within and adjacent to 12 study sites along the Tok River to provide an index to habitat selection.

Winter track surveys of furbearers, gallinaceous birds, snowshoe hares, and moose are being conducted at Nenana Ridge and along the Tok River. Data from multiple counts per winter over several winters will allow statistical comparison of intersection rates, corrected for time since snowfall, among habitat types or treatments.

OBJECTIVE 10: Evaluate the effect of felling debris (aspen trees not removed) on ruffed grouse use of sites that have adequate densities of young aspen stems.

Spring drumming surveys are conducted annually. In addition, an experienced hunter and his trained Brittany pointing dogs were used to conduct flushing counts during August 2000 and 2001 among the aspen treatments and untreated mature forest.

Artificial nests will be placed in felling and burn sites and a control area (mature aspen) at Nenana Ridge to estimate predation rate and, to the extent possible, cause-specific predation.

OBJECTIVE 11: Estimate and compare relative abundance of furbearers (potential grouse predators) among treatment types.

In 2000 we established line transects for winter track surveys of furbearers, gallinaceous birds, snowshoe hares, and moose at Nenana Ridge and along the Tok River in the proposed DOF timber sale NC-837-T. Data from multiple counts per winter over several winters will allow statistical comparison of intersection rates, corrected for time since snowfall, among habitat types or treatments.

OBJECTIVE 12: Analyze and publish results.

Data have been analyzed annually to assess progress toward meeting study objectives and prepare for a final report and possible publications.

OBJECTIVE 13: Involve and inform other professionals and the general public.

Each year presentations are made on boreal forest succession and disturbance at local schools, the University of Alaska Fairbanks (UAF), State agencies, and other venues.

II. SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN THIS PERIOD

JOB 1: Continue a literature review of habitat management techniques and maintain peer contacts to learn about related research.

We continued to obtain current literature on topics germane to study projects. Abstracts were scanned for some citations with the help of administrative staff and put into a ProCite® database for use in research and report writing. University and agency researchers were contacted.

JOB 2: Design and conduct long-term studies to evaluate the effectiveness of different habitat management techniques and applications.

Vegetation response on landscape-scale habitat treatments. The study area was visited during July 2003 to collect data necessary to ground truth the Quckbird image.

Vegetation response on stand-scale habitat treatments

- We continued gathering baseline data in the 12 units that have been selected for study in Block B of the planned NC-837-T timber sale along the Tok River. Seed traps were emptied of coniferous and deciduous seeds in spring and fall during this reporting period. The post-logging broadcast burn of logging slash scheduled for summer 2004 at one of the research plots in the planned timber sale NC-837-T was not completed because timber on the site has not yet been harvested. The DOF now anticipates putting the sale out for bid in autumn 2004.

- Post-logging scarification with a dozer blade and with a disk trench was conducted in October 2003 on a 12-acre timber sale on Nenana Ridge. Permanent plot stakes will be placed and located by GPS in autumn 2004 to facilitate regeneration studies in the future.

JOB 3: Design and conduct long-term studies to determine the response of wildlife populations to habitat treatments.

Wildlife response to landscape-scale habitat treatments. We have not yet addressed this aspect of the program.

Wildlife response to stand-scale habitat treatments.

- Spring drumming surveys of male ruffed grouse were again conducted at Nenana Ridge in spring 2004.

- A kiosk with hunter reporting cards was again used to sample grouse hunting success. Wing barrels were first used in 2003 to obtain harvest samples for age and sex information.

- During May and June 2004, we established artificial nests in felling and burn sites and a control area (mature aspen) at Nenana Ridge to estimate predation rate and, to the extent possible, cause-specific predation.

- Debris from felling and shearblading treatments is denser than debris occurring from natural disturbances in boreal forest. Other researchers who have visited the treatment sites have expressed concern about whether the debris may hinder bird use. Track count data we have collected in prior winters at Nenana Ridge indicate that martens and weasels may preferentially use sites with felling debris, which would heighten predation risk for grouse. We have contracted for debris windrowing on sections of both felling and shearblading treatments to evaluate the effect on vegetative response and intend to evaluate wildlife use between cleared and debris sites by use of track counts and predation on artificial nests and other methods.

- Track surveys of furbearers, gallinaceous birds, snowshoe hares, and moose were conducted once at Nenana Ridge and twice at the proposed Tok River timber sale (NC-837-T) during winter 2003–2004.

JOB 4: Write annual progress reports and a final report, publish selected topics in scientific journals, and participate in professional and public forums relating to study results.

- Paragi continued to serve as co-chair of the Alaska Northern Forest Cooperative to promote communication between forest landowners and researchers on management issues. He took a lead role in organizing the workshop "Managing Small Trees in the Northern Forest" to be held in October 2004. The workshop will include reduction of hazardous fuels, subsistence usage (including habitat), value-added wood utilization, and silviculture.

- We finished a manuscript on aspen regeneration techniques for habitat and distributed it for internal and external review.

- Paragi presented a talk on evaluating vegetation response in the East Fork prescribed burn at the Northwest Section and Alaska Chapter meeting of *The Wildlife Society* in Girdwood, Alaska (May 2004). He also presented the East Fork talk and a poster on aspen regeneration at the 2nd International Wildand Fire Ecology and Fire Management Congress (November 2003).

- Paragi gave presentations on boreal forest disturbance, forest succession, and wildlife habitat to both undergraduate and graduate classes at the UAF.

- A FY03 research performance report and FY05 work plan were submitted to Federal Aid, and a budget request was submitted for FY05.

- A detailed progress report was completed in spring 2003 to distribute preliminary research findings. In February 2004 the report was put on the ADF&G website.

III. ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD

Paragi again coordinated hunter sampling of gizzards from gallinaceous birds for a Swarthmore College physiologist studying how chemicals in road sand can influence bird ecology.

IV. PUBLICATIONS

Paragi, T. 2004. Studying the value of fuels management for wildlife habitat in Interior Alaska. *Western Forester* 49(3):14-15.

V. RECOMMENDATIONS FOR THIS PROJECT

- Implement and evaluate a stand-scale prescribed burn in the Standard Creek timber harvesting area west of Fairbanks.

- Increase the number of aspen units burned annually to aid in the evaluation of the long-term efficacy of prescribed burning as an alternative to mechanical treatments.

- Work with ADNR agencies and UAF researchers to begin evaluation of the role that burning wood for heat and electricity production can serve to reduce enhance habitat and fire risk near Fairbanks and rural villages.

- Revise the aspen manuscript and submit it to the *Northern Journal of Applied Forestry*.

- Conduct two types of scarification and the first of three broadcast burns in summer 2005 at Tok River timber sale NC-837-T.

- Live trap rodents prior to the planned timber harvest a sale NC-837-T (autumn 2004) and determine the relationship between debris volume and distribution on rodent density over time among various post-logging site treatments.

- Continue stand-scale sampling efforts associated with ongoing evaluations (e.g., moose pellets and furbearer track counts at Tok River timber sale and furbearer track counts at Nenana Ridge).

- Continue the ground-truthing and GIS analysis of vegetation response to fire in the 1998 East Fork prescribed burn.

- Continue coordinating assessment of population trends in game birds with Area Biologists on the Interior road system.

VI. APPENDIX

VII. PROJECT COSTS FOR THIS SEGMENT PERIOD

FEDERAL AID SHARE $49,700 + STATE SHARE $16,600 = TOTAL $66,300

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